

(12) UK Patent Application (19) GB (11) 2 322 262 (13) A

(43) Date of A Publication 19.08.1998

(21) Application No 9726174.7

(22) Date of Filing 11.12.1997

(30) Priority Data

(31) 08777989

(32) 24.12.1996

(33) US

(51) INT CL⁶
H04Q 7/30 , H04H 1/00

(52) UK CL (Edition P)
H4L LDSG L1H10 L1H8A

(56) Documents Cited
EP 0537756 A2 WO 97/26724 A2 US 4121158 A

(58) Field of Search
UK CL (Edition P) H4L LDLX LDSG LECX LETXX
INT CL⁶ H04H 1/00 , H04Q 7/30 7/36
Online: WPI

(71) Applicants(s)

Lucent Technologies Inc
(Incorporated in USA - Delaware)
600 Mountain Avenue, Murray Hill,
New Jersey 07974-0636, United States of America

(72) Inventor(s)

David Y Lee

(74) Agent and/or Address for Service

C S T Buckley

Lucent Technologies UK Limited, 5 Mornington Road,
WOODFORD GREEN, Essex, IG8 OTU,
United Kingdom

(54) Abstract Title

Mobile base station

(57) A system for providing multimedia computer services comprises a mobile base station having data storage means and fixed user terminals which also include storage means. The mobile base station may be mounted on a vehicle such as a bus. The storage means of the mobile base station is pre-loaded and may be transmitted to, or received from subscribers when the base station is within communication range of the users. The mobile base station may employ wireless LAN technology and employ frequency hopping spread spectrum technology, or direct sequencing spread spectrum technology over either radio or infra-red frequencies. Cellular techniques such as hand off may be utilised. The data transferred may include that of a meter reading. Alternatively the mobile base station may repeat data from a control station to the users.

FIG. 3

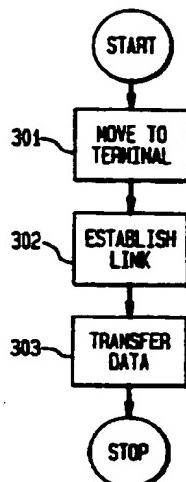
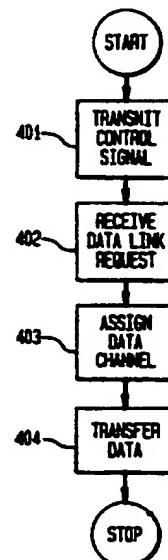


FIG. 4



BEST AVAILABLE COPY

GB 2 322 262 A

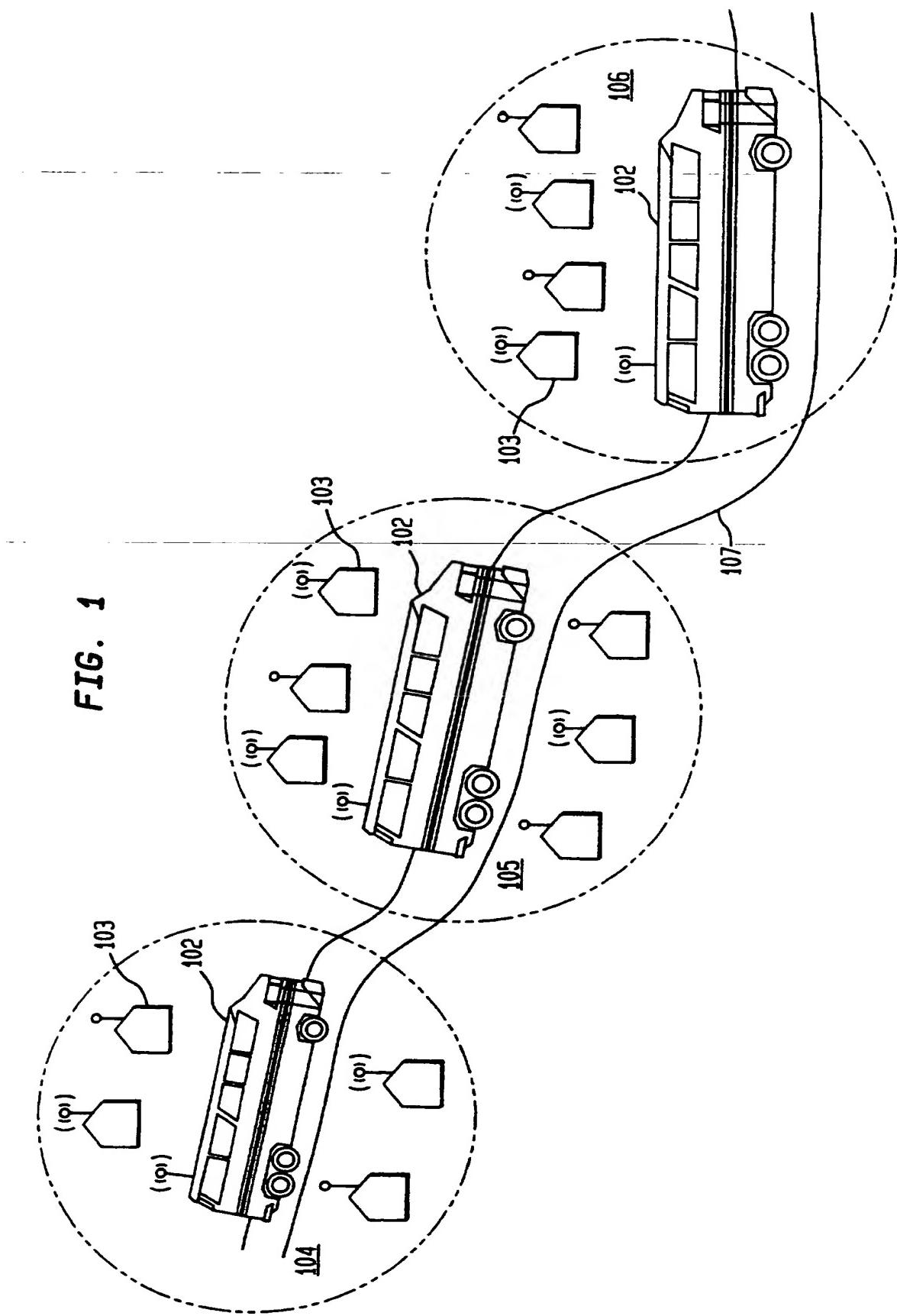


FIG. 2

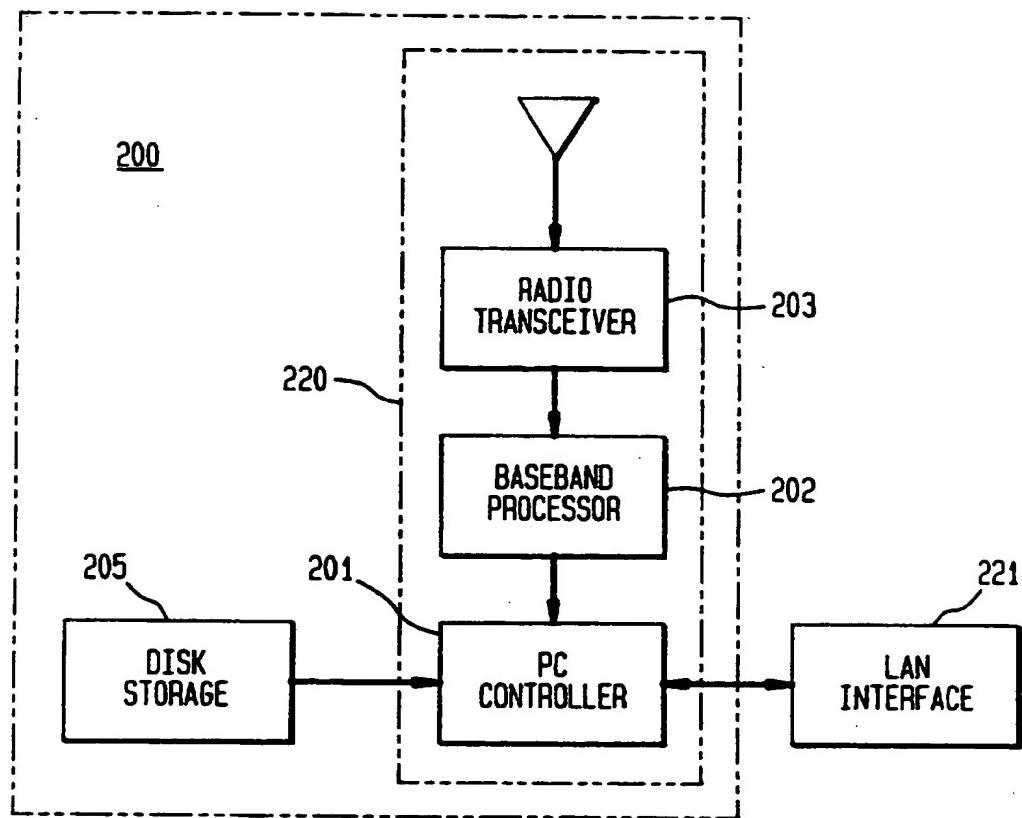


FIG. 3

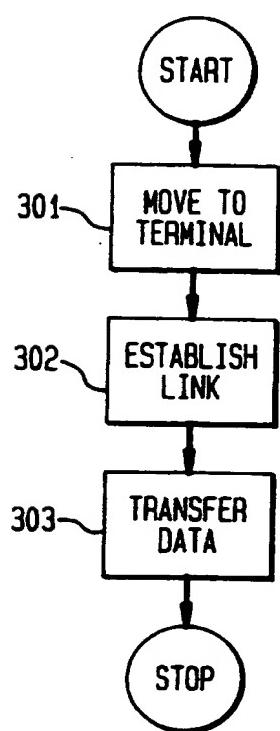


FIG. 4

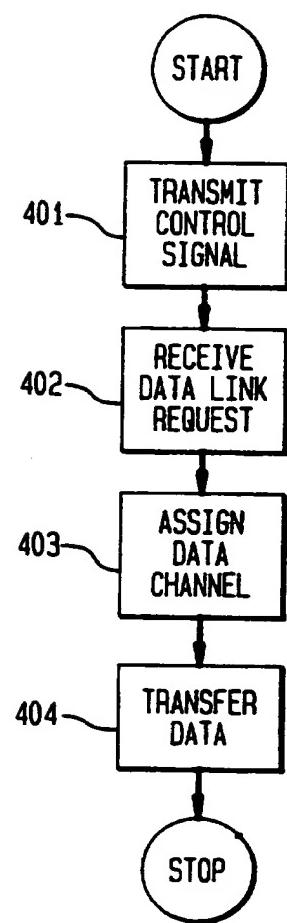
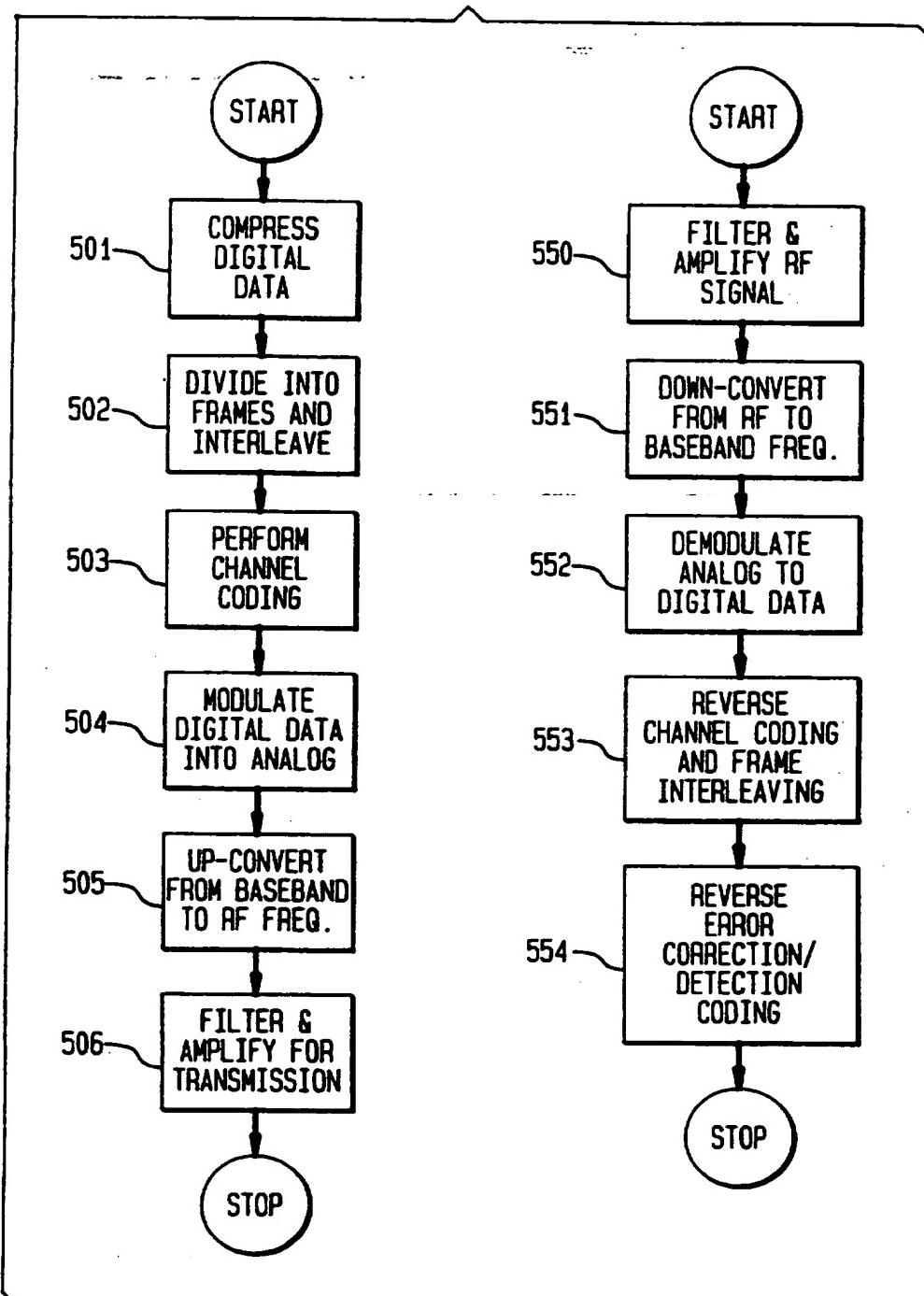


FIG. 5



MOBILE BASE STATION

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention generally relates to wireless communication. More 5 specifically, the present invention relates to a system and method for providing users with a wireless medium using a mobile or travelling base station.

2. Background

The advent of multimedia computer services now allows people to enjoy customized newspapers and magazines, educational programming, and other 10 audio/visual media in the comfort of their own home or office. Although there is a strong demand for such services, deployment has been hampered by the wide bandwidth these products require for transmission. Conventional telephone lines and cellular systems typically support narrower bandwidths, and are inadequate to handle such transmissions. The enormous amount of information comprising these multimedia 15 products tends to bog these systems down unacceptably or to overwhelm them completely resulting in incomplete transmissions. One possible solution is to bolster cellular systems infrastructures and increase the available RF bandwidths these systems are currently allotted. Such a solution, however, is costly and adds to the existing and 20 vehement contention over bandwidth allocation. Consequently, a need exists for a system of delivering multimedia services to user without burdening existing infrastructures. The present invention fulfills this need among others.

SUMMARY OF THE PRESENT INVENTION

The invention relates to a system and method that employs a mobile base station for periodically travelling to a particular area and transmitting and/or receiving 25 information to and/or from a user within the area. The mobil base station has storage means for storing information and mobil wireless communication means for performing

wireless communication within its broadcast area. In a complimentary configuration, the user has a terminal with storage means for storing information and terminal wireless communication means for cooperating with the mobil wireless communication means to facilitate wireless communication therebetween. The method of performing a wireless transfer of information involves moving the mobile base station to the user's particular geographical area such that the broadcast area includes the user's terminal thereby enabling the mobil wireless communication means and the terminal wireless communication means to cooperate and establish a wireless communication link. Next, a direct wireless communication link is established between the mobile base station and the terminal of the user. A transfer of information then occurs between the storage means of the mobile base station and the storage means of the terminal via the wireless communication link. In a preferred embodiment, the wireless communication link is a wireless LAN interface for facilitating transmission of wide bandwidth information.

In accordance with the invention, the user can be provided with periodic access to an otherwise unavailable wireless medium without the need for an elaborate and costly wireless infrastructure.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The invention may best be understood by reference to the following description taken in conjunction with the accompanying drawings, wherein like reference numerals identify like elements, and wherein:

FIG. 1 shows a system employing a mobil base station to provide a wireless medium to users;

FIG. 2 shows a schematic diagram of the mobil communication unit;
25 **FIG. 3** shows a basic flow diagram of a preferred method embodiment of the invention;

FIG. 4 shows a flow diagram of establishing a wireless communicative link as depicted in Fig. 3; and

FIG. 5 shows a flow diagram of the protocol for transmitting/receiving information shown in Fig. 3.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

- The invention relates to a system and method that employs a mobile base station for periodically travelling to a particular area and transmitting and/or receiving information to and/or from a user within the area. The mobile base station has storage means for storing information and mobile wireless communication means for performing wireless communication with a user in its broadcast area. In a complimentary configuration, the user has a terminal with storage means for storing information and terminal wireless communication means for cooperating with the mobile wireless communication means to facilitate wireless communication therebetween. The method of performing a wireless transfer of information involves moving the mobile base station to the user's particular geographical area such that the broadcast area includes the user's terminal thereby enabling the mobile wireless communication means and the terminal wireless communication means to cooperate and establish a wireless communication link. Next, a direct wireless communication link is established between the mobile base station and the terminal of the user. A transfer of information then occurs between the storage means of the mobile base station and the storage means of the terminal via the wireless communication link. The transfer may be from the mobile base station to the terminal, from the terminal to the mobile base station, or both.

The use of mobile base stations facilitates a broad range of wireless services that otherwise may be unavailable. The invention is particularly well suited for broad bandwidth information, such as multimedia products, which is beyond the capability or practical use of conventional cellular and wireless systems. Typical examples of multimedia products include newspapers, magazines, movies, entertainment, graphics, and educational programming. Often, these products are customized according to a geographical area or particularized interests for a particular reader or group of readers. According to the present invention, an early morning delivery truck (e.g., a bread

truck) could travel to a particular area and download a personalized newspaper to a user's terminal.

Although well suited for broad bandwidth services, the invention may also facilitate wireless communication with users in areas that are beyond the reach of

5 traditional cellular networks for reasons such as remoteness, interference or obstruction. In such areas, it may not be cost effective to develop a cellular infrastructure to support wireless services. The present invention obviates problems of remoteness, interference or obstruction by using mobile base station that periodically travel to these remote areas and transmit and receive wireless information. For

10 example, a U.S. Mail truck may be outfitted with a wireless communication unit. As it travels along its appointed route, it may exchange wireless information such as E-mail.

Another approach in reaching users who might otherwise be deprived of conventional cellular services is to use the mobile base station as a repeater. To extend the size of the cell or reach terminals obstructed from the base station, frequently

15 repeaters or reradiators are used. These devices are typically fixed and operate continuously. It may be advantageous in certain instances, however, to use a mobile base station equipped with a more powerful antenna than used by user terminals to act as a mobil repeater or reradiator. Using a mobile base station avoids the expense of erecting permanent repeater stations, especially if the repeater is only needed for certain

20 periods of the day, e.g., rush hour. Additionally, if sufficient and reliable mobile base station traffic exists in an area to provide for continuous mobile base station hand-offs, then continuous wireless services may be provided using a series of mobil base stations.

In yet another application, the present invention may be used to automate tasks that require periodically gathering or disseminating information in a particular

25 geographic location. For example, it may be advantageous for a mobile base station to obtain meter readings, e.g., gas meter readings, and other data from users along its appointed route. This information may then be transmitted to a user desiring the information, e.g., the gas utility, along the mobile base station's route.

Therefore, it should be apparent that the present invention may be practiced in a

variety of ways to provide previously unavailable wireless services to a set of users.

The system and method of the invention are considered in more detail below.

A suitable system 100 is depicted in Figure 1. The main component of the system 100 is a mobile base station 102 which is configured to serve user terminals 103 within its broadcast area. As the mobile base station moves, the broadcast area changes as does the users served therein. In Fig. 1, for example, the mobile base station 102 sequentially serves areas 104, 105 and 106, and the users contained therein, as it travels down a path 107.

A mobile base station according to the present invention includes any vehicle capable of locomotion having a mobil wireless communication unit. The type of vehicle is irrelevant, however, it may be preferred to use vehicles, such as delivery, municipal or public transportation vehicles, which are already scheduled to travel to certain geographic areas to perform another task. These vehicles could be fitted with a mobil wireless communication unit to provide a wireless link for exchanging information with a user while temporary in its proximity.

A suitable mobile wireless communication unit 200 is depicted schematically in Fig. 2. The essential function of the unit is to communicate with the terminal using mobil wireless communication means 220. The technology employed by the mobil wireless communication means 220 depends upon the services provided. For example, if the link is used for narrow bandwidth information, then a conventional cellular phone and modem may be adequate. On the other hand, if the link is used for multimedia, or other services requiring wide bandwidth, it may be beneficial to use a wireless LAN interface 221. Wireless LAN interfaces are preferred because of their higher operating speed and ability to transmit and receive large amounts of information quickly. Such wireless network interfaces are known in the art, and a review of the various products and technologies available is provided in Padraig R. Boyle, *Wireless LANS: Free to Roam*, PC MAGAZINE 175-204 (Feb. 20, 1996). Conventional technologies for wireless data transfer include frequency hopping spread spectrum (FHSS) and direct sequencing spread spectrum (DSSS) over radio or infra-red frequencies. The preferred

techniques are spread spectrum technologies operating in the ISM (industrial, scientific and medical) bands of the electromagnetic spectrum.

In this embodiment, the mobil communication means 220 comprises a central computer controller 201 which in turn is operatively connected to a baseband processor 202. Connected to the base band processor 202 is a radio receiver 203. The controller 201, baseband processor 202 and radio receiver 203 cooperate to convert the analog waveform between RF and baseband frequency and to modulate/demodulate between digital data and analog signals when receiving and transmitting signals. These components may even perform and control channel coding and frame interleaving functions. The components used to perform these communication functions are well known in the art and are commercially available.

In one preferred embodiment, the computer controller is also operatively connected to storage means 205. Storage means may be any computer recognizable storage medium such as a disk, tape, CD, ROM or RAM. The storage means stores information for broadcast to the terminals, or information received from the terminals. It may also be preferred to equip the unit 100 with a conventional wireline LAN interface operatively connected to the computer controller 201. The wireline LAN interface facilitates communication between the mobile base station and an information depot (discussed below).

A user terminal according to the present invention broadly refers to any wireless device used by a user to receive and transmit signals in a wireless system. The terminal has a terminal wireless communication means configured to cooperate with the mobil wireless communication means to facilitate wireless communication between the terminal and the mobile base station. Suitable terminals are well known in the art and include cellular handsets and computers with wireless modems or wireless LAN interfaces.

The system 100 operates in accordance with the basic method depicted in Fig. 3. As shown in Block 301, the mobile base station moves to a particular geographical area containing a user terminal. The mobile base station moves within a certain

proximity of the user terminal such that the mobile base station's broadcast area includes the terminal. This proximity allows the mobil wireless communication means to cooperate with the terminal wireless communication means. Next, in Block 302, a wireless communication link is established between the mobile base station and the 5 terminal. Finally, information is transmitted between the mobile base station and the terminal via the wireless communication link as shown in Block 303.

Specific embodiments of the present invention will now be considered in light of the basic system and method discussed above. These embodiments should not be construed to limit the scope of the invention.

10 When considering the method and system of the present invention, the analogy between it and a conventional cellular network should noted and understood. In a conventional network, a mobile switching center (MSC) controls a fixed base station in a cell site via a landwire, and the base station serves a set of mobil terminal units. The system of the present invention, however, uses mobil or travelling base stations to serve 15 a fixed user base. Nevertheless, the basic situation of a mobil point communicating with a stationary point is common to both. Therefore, the protocols and technologies used for facilitating such communication remain fundamentally the same and are hereby incorporated into the embodiments of the present invention. Such technologies include but are not limited to Advanced Mobile Phone System (AMPS), General System for 20 Mobil Communications (GSMC), Personal Digital Cellular (PDC), Time Diversity Multiple Access (TDMA) and Code Division Multiple Access (CDMA).

The process of establishing a communicative link in Block 302 of Fig. 3 represents important aspect of the system. A preferred embodiment of the process is shown in Fig. 4. In that embodiment, the mobil station transmits a control signal to the 25 terminal in Block 401. The control signal typically contains identification of the base station and may contain other information such as available services if appropriate. In the preferred embodiment, this signal comprises a pilot signal. The attributes of a pilot signal may vary, although a preferred pilot signal is transmitted by each mobile station and is used as a coherent carrier reference for demodulation by all user terminals. It is

transmitted at a relatively higher level than other types of signals which allows for extremely accurate tracking. Using known cellular protocol techniques, the user terminal may obtain synchronization with the nearest mobile base station without knowing the identity of the mobile base station. After synchronization, the pilot signal
5 is used as a coherent carrier phase reference for demodulation of the other signals from this mobile base station. The pilot signal technology is well known in the art and is described in for example CDMA Network Engineering Handbook, Volume 1: Concepts in CDMA, November 23, 1992, which is incorporated herein by reference.

After acknowledging the pilot signal, the user terminal submits a request for a
10 data communication link. Referring back to Fig. 4, in Block 402, the mobile base station receives a data link request from the terminal. The data link request may also contain user identification and other "sign-on" information. Once logged in, the mobile base station then instructs the terminal which data channel to use in Block 403. With the data channel established between the mobile base station and the terminal, data then
15 can be transferred therebetween in Block 404 according to the request of either the terminal or mobile base station. Table 1 shows a preferred sequence of transmission between the mobile base station and the terminal. It should be understood, however, that variations are possible in this protocol, for example, the roles of the mobile base station and the terminal may be reversed.

TABLE 1

Row	Mobile Base Station	Channel	Fixed User
1	Broadcast pilot and control information (e.g., base station ID, available service)	Control -->	Detect pilot and read control information
2	Verify user information against data base	Control <--	Transmit sign-on information (e.g., user ID)
5	Acknowledge and inform user which traffic channel to use	Control -->	Switch to traffic channel
4	Retrieves data from storage	Data <--	Send details of service request
5	Prepare data for transfer, send data over the air and wait for acknowledgement until end of transfer or out of signal coverage range	Data ->>-	Receive data and send acknowledgement until end of transfer or out of signal coverage range

- After the traffic channel has been fully initialized, the mobile base station initiates the data transmission flow. The wireless data transfer between the mobile communication system and a user terminal may be controlled by wireless transmit/receive protocols. One embodiment of this protocol is depicted in Fig. 5. In Block 501, digital data (e.g. text, image, video) is compressed, and if necessary error detection/correction code may be added. Block 502 divides the encoded data stream into frames which may also involve interleaving data from multiple frames to protect entire frames from being destroyed by a signal fade. In Block 503, channel coding is performed on the interleaved data based on the modulation scheme used. Next, the digital data is modulated into analog waveform in Block 504. Block 505 up-converts analog waveform in baseband frequency to radio frequency (RF), and Block 506 filters and amplifies the RF signal for wireless transmission.
- The reception protocol is also depicted in Fig. 5. In Block 550, the RF signal is received which also may involve filtering and amplifying it. Block 551 down-converts

the analog waveform from RF to baseband frequency and Block 552 demodulates the analog signals to digital data. In Block 553, the reverse process of channel coding and frame interleaving is performed. Finally, the data is decompressed in Block 554 which may also require reversing the error correction/detection code to obtain original data.

5 In addition to this basic protocol, other known techniques such as call handoff, power control, dynamic bandwidth allocation may be employed to efficiently share the RF spectrum between multiple terminals/mobil base stations, and guarantee the integrity of the RF links. Such signal control is known in the art and suitable systems include AMPS, GSMC, PDC, TDMA and CDMA.

10 One preferred embodiment of the invention, for example, uses cellular hand-off technology to switch from one mobil base station as it leaves a particular region to another mobil base station in the region having a stronger signal. This may be performed by handing-off individual users, or by handing-off groups of users. This embodiment, however, requires that another mobil base station is in the vicinity to accept the user(s). In another embodiment, a mobil base station transmits as much information as possible while in proximity of the user and then stops when the communicative link becomes too weak. Later, when another mobil base station enters the vicinity, it may continue where the first base station left off based upon a signal from the user's terminal. To ensure that the user would eventually receive all of the
15 information, a multitude of vehicles scheduled to travel in the area may be loaded with the same information. For example, several buses servicing the same line may be loaded with similar information for dissemination—one bus can take over where the bus in front of it left off.

20

25 The inventive system and method may be optimized for efficiency and lower cost. For example, in one preferred embodiment, the mobile base station broadcasts information common to multiple users simultaneously. Then, each user terminal only requests those frames that cannot be recovered by the error detection codes, or information particular to that user.

Until now, it has been presumed that the mobile base station is pre-loaded with

the information to be dispatched. One embodiment of the invention, however, includes the presence of a control station. In one preferred embodiment, the control station serves as an information depot to provide the mobile base station with information and/or to receive information from the mobile base station. The information held by

5 the control station may be processed on- or off-site. For example, a multimedia service may prepare specified news papers for users and then transmit the information over convention communication line to the various control station. These control station would then be responsible for delivering the information to the mobile base station which in turn deliver it to the users. This way, the control station can concentrate on

10 its primary purpose, e.g., maintaining buses, and only act as a conduit for the information to be disseminated.

Transferring information between the mobil base station and the control station may be performed in a number of ways. In one preferred embodiment, the mobile base station physically docks at the control station and "plugs" into it for the information

15 transfer. Such a information transfer may occur using convention wireline means such as an Ethernet, using known protocols such as FTP or TCP/IP. Although the control station may be a facility dedicated to mobile base station information transfer, in this situation it is preferable to use an existing facility that the mobile base station would ordinarily frequent in the normal course of business. For example, if the mobile base

20 station was a public transportation bus, the control station might be the bus depot. Every morning before the bus went on its appointed rounds, information might be loaded into the mobil wireless communication unit's storage for dissemination to users along the bus path.

In an alternative embodiment, the mobile base station would not be physically

25 on-site, but rather would receive the information over a wireless link. Although conventional approaches may be used, preferably the data transfer between the control station and mobile base station would be performed in a similar fashion as the data transfer between the mobile base station and the terminals. Accordingly, the control station may have a wireless communication means similar to that used by the terminals

such that information may be transferred between the mobile base station and the control station. This embodiment is preferred from a wireless transfer perspective because it involves no additional equipment on the mobile base station. Thus, as with the user terminals, the mobile base station would travel within a certain proximity of
5 the control station to effect a transfer.

Obviously, numerous other modifications and variations of the present invention are possible in the light of the above teachings. It is therefore understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

WHAT IS CLAIMED IS:

1. A method of providing a wireless medium to a user in a particular geographic area using a mobil base station, said mobil base station having storage means for storing information and mobil wireless communication means for performing wireless communication within its broadcast area, said user having a terminal with storage means for storing information and terminal wireless communication means for cooperating with said mobil wireless communication means to facilitate wireless communication therebetween, said method comprising the steps of:
 - 5 moving said mobile base station to said particular geographical area such that said broadcast area includes said terminal thereby enabling said mobil wireless communication means and said terminal wireless communication means to cooperate and establish a wireless communication link;
 - 10 establishing a direct wireless communication link between said mobile base station and said terminal of said user; and
 - 15 transmitting information between said storage means of said mobile base station and said storage means of said terminal via said wireless communication link.
2. The method of claim 1, wherein said mobil wireless communication means and said terminal wireless communication means employ wireless LAN technology for facilitating a wireless LAN communication link.
- 20 3. The method of claim 2, wireless technology selected from the group consisting of frequency hopping spread spectrum technology, and direct sequencing spread spectrum technology over either radio or infra-red frequencies.
- 25 4. The method of claim 2, wherein said mobil wireless communication means and said terminal wireless communication means employ cellular technology.

5. The method of claim 4, wherein said cellular technology at least provides for a function selected from the group consisting of hand-off, power control, dynamic bandwidth allocation control, and combinations thereof.
6. The method of claim 2, wherein hand-off control involves said terminal instructing said mobil base station to begin transmitting said information from a certain point, said certain point corresponding to where a previous mobil base station discontinued transmitting said information to said terminal.
7. The method of claim 2, wherein said information is transmitted over a wide bandwidth.
- 10 8. The method of claim 7, wherein said information relates to a multimedia product.
9. The method as defined in claim 1, wherein information is a meter reading transferred from said user to said mobil base station.
10. The method as defined in claim 1, wherein establishing said communicative link and transmitting said information comprises the steps of:
 - transmitting a control signal from said mobile base station to said terminal, said control signal containing identification of said base station;
 - receiving a data link request from said terminal;
 - transmitting a second control signal informing said terminal which data channel to use;
 - receiving an information request from said terminal on said data channel; and
 - transmitting information according to said information request from said terminal.

11. The method of claim 10, further comprising the step of:
comparing an identification of said terminal against a database of users to verify
that said terminal is a subscriber.
12. The method of claim 1, wherein said system further comprises a control station
5 having storage means and control communication means for establishing a second
communication link between said control station and said mobil base station, said
method further comprising:
transferring said information between said storage means of said control station
and said storage means of said mobile base station over said second
10 communicative link.
13. The method of claim 12, wherein said second communicative link is a wireline.
14. The method of claim 12, wherein said second communicative link is wireless
LAN interface.
15. 15. A method of providing a wireless communication line between a user in a
particular geographic area and a wireless communication system, said system having a
control base station for transmitting and receiving signals and a mobil base station
having repeater means for receiving a signal and amplifying it for rebroadcast, said user
having a terminal with terminal wireless communication means for cooperating with
20 said repeater means to facilitate wireless communication therebetween, said method
comprising the steps of:
moving said mobile base station to said particular geographical area such that
its broadcast area includes said terminal thereby enabling said mobil
repeater means and said terminal wireless communication means to
25 cooperate and establish a wireless communication link; and
repeating signals containing said information using said repeater means.

16. A mobile base station for providing a wireless medium to a user in a particular geographic area, said user having a terminal with terminal storage means and terminal wireless communication means, said mobil base station comprising:

- a vehicle having means for locomotion;
- 5 a mobil wireless communication unit mounted on said vehicle, said mobil wireless communication unit having mobil storage means for storing information and mobil wireless communication means for cooperating with said terminal communication means to form a wireless link for transmitting information between said terminal storage means and said
- 10 mobil storage means when said mobil base station is within a certain range of said terminal.

17. The mobil base station of claim 16, wherein said mobil wireless communication means employs wireless LAN technology for facilitating a wireless LAN communication link.

15 18. The mobil base station of claim 17 wireless technology selected from the group consisting of frequency hopping spread spectrum technology, and direct sequencing spread spectrum technology over either radio or infra-red frequencies.

19. The mobil base station of claim 17, wherein said mobil wireless communication means and said terminal wireless communication means employ cellular technology.

20 20. The mobil base station of claim 19, wherein said cellular technology at least provides for a function selected from the group consisting of hand-off, power control, dynamic bandwidth allocation control, and combinations thereof.

21. The mobil base station as defined in claim 21, wherein said mobil wireless communication means comprises:

- means for transmitting a control signal from said mobile base station to said terminal, said control signal containing identification of said base station;
- 5 means for receiving a data link request from said terminal;
- means for transmitting a second control signal informing said terminal which data channel to use;
- means for receiving an information request from said terminal on said data channel; and
- means for transmitting information according to said information request from
- 10 said terminal.
22. The mobil base station of claim 21, wherein said mobil communication unit further comprises:
- means for comparing an identification of said terminal against a database of users to verify that said terminal is a subscriber.
- 15 23. The mobil base station of claim 16, wherein said wireless communication means comprises:
- means for compressing digital data;
- means for dividing and interleaving said data into frames;
- means for channel coding said frames;
- 20 means for modulating said coded frames into an analog waveform;
- means for upconverting said analog waveform from baseband frequency to radio frequency (RF); and
- means for amplifying said RF signal for wireless transmission.
24. The mobil base station of claim 16, wherein said mobile base station is a
- 25 commercial vehicle normally scheduled to travel to said particular geographical area.

25. The mobil base station of claim 24, wherein said commercial vehicle is selected from the group consisting of public transportation vehicles, school buses, delivery vehicles, municipal vehicles, taxi cabs, and combinations thereof.
26. A mobil wireless communication unit for providing a wireless medium to a user, said user having a terminal with terminal storage means and terminal wireless communication means, said mobil wireless communication unit comprising:
 - means for mounting to a vehicle having means of locomotion;
 - mobil storage means for storing information; and
 - mobil wireless communication means being adapted to cooperate with said terminal communication means to form a wireless link for transmitting information between said terminal storage means and said mobil storage means when said vehicle is within a certain range of said terminal.
27. The mobil base station of claim 26, wherein said mobil wireless communication means employs wireless LAN technology for facilitating a wireless LAN communication link.
28. The mobil base station of claim 27, wireless technology selected from the group consisting of frequency hopping spread spectrum technology, and direct sequencing spread spectrum technology over either radio or infra-red frequencies.
29. The mobil base station of claim 27, wherein said mobil wireless communication means and said terminal wireless communication means employ cellular technology.
30. The mobil base station of claim 29, wherein said cellular technology at least provides for a function selected from the group consisting of hand-off, power control, dynamic bandwidth allocation control, and combinations thereof.

31. The mobil base station as defined in claim 26, wherein said mobil wireless communication means comprises:

means for transmitting a control signal from said mobile base station to said terminal, said control signal containing identification of said base station;

5

means for receiving a data link request from said terminal;

means for transmitting a second control signal informing said terminal which data channel to use;

10

means for receiving an information request from said terminal on said data channel; and

means for transmitting information according to said information request from said terminal.

32. The mobil base station of claim 31, wherein said mobil communication unit further comprises:

15

means for comparing an identification of said terminal against a database of users to verify that said terminal is a subscriber.

33. The mobil base station of claim 26, wherein said wireless communication means comprises:

means for compressing digital data;

20

means for dividing said data into frames;

means for channel coding said frames;

means for modulating said coded frames into an analog waveform;

means for upconverting said analog waveform from baseband frequency to radio frequency (RF); and

25

means for amplifying said RF signal for wireless transmission.



The
Patent
Office

20

Application No: GB 9726174.7
Claims searched: 1 to 14, 16 to 33

Examiner: Glyn Hughes
Date of search: 11 June 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): H4L (LDSG, LECX, LETXX, LDLX)

Int Cl (Ed.6): H04H 1/00, H04Q 7/30, 7/36

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X, P	WO 97/26724 A2 (HE HOLDINGS) see whole document	1, 2, 4, 12
X, Y	EP 0537756 A2 (FUJITSU) see in particular column 10 lines 27 to 29	X: 1, 12 Y: 16, 26
Y	US 4121158 (HANNI) see figure 1	16, 26
&	EP 0815662 A1 is equivalent to WO 97/26724 A2	

- X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family

- A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.

THIS PAGE BLANK (USPTO)

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

THIS PAGE BLANK (USPTO)